External Evaluator Report
CELF Civic Science: Inquiry to Action
National Geographic Society – Exploration Grant

Declaration of Independence and Objectivity

This document represents the comments of the external evaluator. The evaluation is based on direct observations of project activities and deliverables, verbal interviews with project participants, teacher artifacts, conversations with the grantee project director and facilitators, and reviewing documentation provided by the grantee, grant information posted online by the National Geographic Society funding agency. The evaluator attests to having experience reviewing federal government and foundation STEM education grant projects. In addition, the evaluator has a scientific background related to the activities in the grant project in addition to experience conducting and publishing science education research. The evaluator declares there is no conflict-of-interest relationship with the Children’s Environmental Literacy Foundation (CELF) and is providing an unbiased assessment of the grant project. CELF and the evaluator mutually agreed to the conditions of a grant evaluator Consulting Agreement on May 22, 2021.

Evaluator:
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Ethics Statement

I attest to the honesty and integrity of the entire evaluation process. During the evaluation process, I respected the dignity, privacy, security, and self-worth of the CELF staff, program participants, partners, and other stakeholders with whom they interacted. Specific details of the project and project evaluation were not shared publicly or privately without the consent of CELF.

Signature
Dr. Brian R. Shmaefsky

Date of Report

This report was completed on December 2021
Organizational and Grant Information

Grantee Organization

Children’s Environmental Literacy Foundation (CELF)
CELF New York
200 Summit Lake Drive, Suite 130
Valhalla, NY 10595
914-449-6868

CELF Texas
PO Box 70905
Houston, TX  77270
832-477-4583
Contact: Lisa Gianukos, Program Director

Funding Agency Information

National Geographic Society, 1145 17th Street Washington, D.C.
Grant Program: National Geographic Society – Exploration Grant
Grant Cycle Dates: 15 July 2020 to 30 July 2021

Grant Assessment Statement

This external evaluation assesses if the outcomes of the grant project achieved the goals established by the grantee and aligns with the intention of the National Geographic Society Exploration Grant program. The purpose of the National Geographic Society Exploration Grant program is to support projects in the areas of conservation, education, research, storytelling, and technology. Applicants were expected to demonstrate successful completion of the grant-funded project with measurable and/or tangible results.

The grantee chose to carry out an education project that included the following disciplines or fields of study: biodiversity conservation, civic science, civics, communication, data collection and analysis, ecology, energy and fuels, environmental health, green and sustainable science and technology; occupational health, public health, social sciences, soil science, and urban studies. Since 2003, CELF has been a provider of professional development and student training programs focused on sustainability education for the K-12 learning experience. CELF recognizes the need to instruct educators and students on human health, poverty, consumption, and conflict and the environment. CELF’s track record of delivering effective and relevant educational programming is assurance that they can produce a quality educational project. The disciplines covered in the scope of the education project were within the capabilities of the CELF staff and project collaborators.

In this evaluation it is understood that unforeseen circumstances arising from the COVID-19 pandemic required CELF to adjust specific activities without compromising the quality of deliverables planned in the grant proposal. The ability for CELF to carry out the project to accommodate for COVID-19 precautions is included in this report.
Summary of Project

Project Title

CELF Civic Science: Inquiry to Action

Goals of Project

This proposed project was designed to enhance CELF’s existing Civic Science: Inquiry to Action program which is described as an interdisciplinary place-based education project. The project implements a project-based STEAM learning unit for engaging students in crowd-source air quality monitoring activities. The monitoring activities place students in an authentic civic science setting in which students assess and communicate local air quality issues and make informed suggestions for resolving any issues. CELF proposed to use funding from the National Geographic Society to (1) scale the program to schools in the Houston region; (2) scale the program to additional schools in New York City by providing a 3-day teacher training summer institute; (3) introduce additional air quality monitoring devices to interface with both Apple and Android devices to increase student experiences with data collection and technology; (4) scaffold the middle school program for high school level to include grades 5-12; (5) Provide turn-key training opportunities during the CELF Summer Institutes for participants to deepen their practice in P3 pedagogy and extend Project reach.

Project Target Audience

The proposed target populations for the grant project included middle school and high school STEM teachers in underserved communities. CELF selected Houston, TX as one project site. Houston is in Harris County and is adjacent to Galveston County. These two counties contain considerable populations of underrepresented/minority (61-75%) and economically disadvantaged groups (64-89%-ISD data) that are particularly vulnerable and a special focus of this project. The region has a history of environmental injustice, primarily related to air and water quality. New York City was selected as the second project site. Like Houston, New York City has a large percentage of families below the poverty level and a significant proportion of underrepresented/minority population. New York City also has a history of environmental injustice situations that put the population at greater health and economic risks with severe weather events and pollution impacts.

Assessment of Goal Achievement

The enhancements proposed in this project retained the integrity of the original CELF Civic Science: Inquiry to Action program which included (1) providing an authentic research-based learning experience targeting air quality in students’ communities; (2) engaging students in personal and collective actions that affect their local neighborhoods and community health; (3) providing teachers with a program that enables students to connect the science research process in a meaningful active way that addresses real problems and their solutions; (4) increasing teachers’ understanding of the interdependence of economic, environmental, and social factors around a health issue by learning a place-based action research unit using citizen science, and (5) developing teachers’ turn-key skills by modeling project-based learning and
providing a variety of technologies and resources to train additional educators in the program, thereby multiplying the value of the project.

CELF also demonstrated compelling evidence that the enhancements to the original project were achieved as stated in the grant proposal with some modification to accommodate for the COVID-19 Pandemic. (1) scale the program to schools in the Houston region; (2) scale the program to additional schools in New York City by providing a 3-day teacher training summer institute; (3) introduce additional air quality monitoring devices to interface with both Apple and Android devices to increase student experiences with data collection and technology; (4) scaffold the middle school program for high school level to include grades 5-12; (5) Provide turn-key training opportunities during the CELF Summer Institutes for participants to deepen their practice in P3 pedagogy and extend Project reach.

Assessment of Project Methodology and Practices

Overall, CELF was exceptional at building upon previous efforts at engaging STEM teachers and students in critical thinking activities that promote healthy communities and student advocacy. CELF fulfilled its commitment to expand its outreach of the “Civic Science: Inquiry to Action” project to new middle school and high school markets in Texas and New York. The goal of capturing an audience of “hundreds of students” as mentioned in the grant application reached 2279 students in this project. CELF engaged the students in the STEM using the well-research strategy of role playing. Role playing exercises add relevancy to STEM course content by providing students with opportunities to assume the role of a person in a problem-solving situation. To encourage teamwork and collaborative communication, the “Civic Science: Inquiry to Action” project placed the students in groups which can play out a more complex scenario.

CELF’s objective of including a diversity, equity, and inclusion component into the program was achieved by focusing the role-playing activities on environmental health situations that disproportionately impact underrepresented communities in areas close to the schools. Using air quality as an environmental health issue is a particularly relevant issue because it is something students are likely aware of and can quantitate; specifically, using data analysis methods that students can understand. The air quality and mapping materials provided by project partners facilitated the students’ ability to monitor and track air pollution with simple to use and inexpensive methods provided by the grant partners. Sustainability of the project was supported by using air quality methods that teachers found pragmatic and affordable.

The conversion to a virtual platform teacher training strategy achieved the same outcomes as the on-site training proposed in the original grant proposal. CELF made effective use of synchronous virtual training modalities and scheduled virtual office hours to address teacher questions. The teachers from different regions were also encouraged to asynchronously share their experiences with conducting project activities.

The student symposium component of the project proved highly effective at giving students the experience at improving communication skills, networking with others, gaining expert knowledge about environmental health, and renewing motivation and confidence at conducting applied scientific research. The symposium was carried out very successfully using a virtual platform that replaced the individual on-site presentations of student projects. The platform modeled the virtual conference websites adopted
by businesses and professional organizations used during the COVID pandemic. This platform brought together teachers from different regions and students into one large conference. Having a combined symposium was highly beneficial because it provided teachers and students with insights from project participants outside of their region.

**Deliverables Assessment**

Overall, the CELF staff were successful at completing the project deliverables as described in the grant proposal. Specific comments for the deliverables are below. Table 1, which follows the deliverables assessment discussion, displays the success at achieving each deliverable.

**School Outreach and Marketing**

CELF’s efforts at school outreach and marketing were successful in recruiting the intended target audience of teachers. Specifically, CELF recruited a representative spectrum of middle school and high school STEM teachers as planned in the project proposal. The breadth of disciplines exploited the benefits of multidisciplinary teamwork, particularly providing the teachers with the ability to utilize knowledge, skills, and best practice from multiple teaching subject areas. In addition, the recruitment efforts brought in a diversity of schools including those serving Low Income Neighborhoods as defined by the Department of Housing and Urban Development (HUD). Thus meeting CELF’s goal to involve teachers and students in underserved areas that would benefit from the citizen science student projects.

CELF’s outreach endeavors were comprehensive and effective. In New York CELF made use of existing long-term contacts in New York. Prior experience with offering NYC Department of Education's approved credit-bearing teacher training workshops leveraged CELF’s ability to recruit teachers in New York. In Texas, CELF searched out new contacts in Texas to solicit program participants. CELF made use of a regional Education Service Center and local Department of Education to advertise the project. Marketing was also done through contact with local independent school district administrators, universities, environmental groups, and informal education centers.

**Selection of Project Partners**

Workshop partners selected during the planning process complemented the goals and outcomes of the project. Selected partners share a mission of building community leaders empowered to advocate for environmental justice. One partner, Plume Labs, was effective at supplying a low-cost air quality tracking app and provided the teachers with technical support. The other partner, McMac CX, is an established grassroots partner with CELF, and supplied inexpensive and simple to use air monitoring equipment. McMac CX availed themselves for technical support. Both partners have the infrastructure to support teachers in continuing the project once the grant is completed.

CELF leveraged its long-term working relationship with Young Voices for the Planet as a supplier of student advocacy resources. Young Voices for the Planet’s curriculum materials show how environmental circumstances are constantly affected by the actions and behaviors of people and organizations in that context. The curriculum materials are supported by evidence-based studies and are appropriate for the learning standards of the participating schools. Young Voices for the Planet also provides teachers with
youth environmental advocacy documentaries that highlight student-driven environmental advocacy activities. Teachers used compelling documentaries to inspire the students and to demonstrate how to realistically accomplish an advocacy action plan. These resources will be available to teachers after the grant is completed.

The three other content partners included in the grant proposal worked effectively with the virtual format of the project. Their expertise and content greatly contributed to an accurate and realistic understanding of place-based civic engagement for the teachers and the students. The Icahn School of Medicine at Mount Sinai (Mount Sinai), the CUNY School of Law Center for Urban Environmental Reform (CUER), and the New York City Department of Health provided CELF with a wealth of information that was translated through the workshops to the teachers. Mount Sinai is noted for being sensitive to the social and health care needs of the different communities it serves. CUER’s mission, which aligns with the goal of the project, is to provide resources for community groups wanting to obtain direct and meaningful participation in environmental decision-making. The New York City Department of Health has a core value that includes addressing enduring gaps in health in underserved communities. They also recognize that structural racism is the root of these health inequities.

Jesse Jones Park & Nature Center was added as an additional partner to support the summer institute in Texas. The Park is dedicated to environmental and natural history, education, wildlife conservation and passive recreation in the Houston area. In addition, a large segment of the park’s service area includes underrepresented communities exposed to environmental injustices. Park officials plan on being a sustainable partner with CELF by hosting environmental quality measurement field trips as well as serving directly as a resource for teachers after the grant is completed.

**Planning and Conducting Teacher Workshops**

CELF staff achieved it targeted goals of teacher workshops by conducting direct training on CELF’s Inquiry to Action Framework, setting up strategic partnerships with content and technology experts, instructing on data collection and analysis, teaching the principles of air monitoring technology and online platforms, and providing public speaking and advocacy experience for participating students. CELF performed a brilliant job migrating the project from to a completely virtual format. Most importantly was that the virtual teacher training workshop sessions were appropriately scaffolded, highly organized, flexibly scheduled, and suitably paced to accommodate the workload of the teachers.

CELF’s proposal to facilitate teacher instruction using Schoology perfectly delivered the teacher workshop outcomes described in the grant proposal. The CELF staff made effective use of the Schoology course platform for asynchronous teacher instruction, sharing of teacher artifacts, discussion boards communication, and posting of CELF Course Materials. Schoology appeared to be a good platform choice because it was an accessible and user-friendly instructional interface. It also offered the CELF staff and teachers the ability to organize, manage, and share workshop content. Enrolling all the teachers into the same Schoology training permitted teachers to share ideas and strategies across teachers and schools.

All live workshop sessions utilized the features of Zoom that make it an effective and reliable online meeting tool. CELF used a systematic approach of first educating teachers about engaging students in
civic science and transforming the classroom into a brave, trusting learning community. CELF made effective use of the online productivity software before Padlet to post assignments and resources. The Padlet content provided by the CELF was instructive to the teachers and elicited thoughtful responses from the teachers. Included in the teacher Padlet postings were relevant resources for the other teachers. The Padlet environment did not detract from the type of participant sharing that would have taken place at face-to-face workshops. CELF were sensitive to the unexpected commitments required of teachers and accommodated teachers who could not attend by providing recordings of the live Zoom workshops.

The school site visits and on-site co-teaching deliverables proposed in the grant application were not possible because of the COVID pandemic. At first, CELF staff were not able to do site visits and take part in on-site co-teaching activities as proposed in the original grant application. The onsite visits and co-teaching were replaced with virtual office hours using Zoom. Zoom office hours were supported by asynchronous and synchronous email and virtual meeting support upon request. This modification had no negative impacts on the outcomes of the deliverable. Teachers were able to implement and complete the air monitoring data collection and analysis effectively with no expected or unusual complications. CELF was able to make one site visit in the Fall to one group of teachers in Texas.

CELF also made use of the virtual platform to provide expert speakers at the workshops and symposium who would not have been available for the on-site workshop format. One speaker, Dr. Maida Galvez, offered the teachers valuable insights into children’s environmental health concerns as an enhancement to the teacher workshops. CELF also made good use of the online environment by posting Q&A sessions, instructional videos on the materials and apps used for data collection, and providing online links to YouTube for teachers’ content.

**Student Symposium Planning and Execution**

CELF came up with an exceptional alternative to the on-site student symposiums that were originally going to be hosted individually at the schools. The CELF made effective use of their staff, resources, and scheduling by combining the separate on-site symposiums into a single virtual symposium. The Gather platform selected by the CELF staff was as an excellent vehicle for immersing teachers and students in an environment resembling an authentic scientific conference. Combining the symposiums permitted the teachers from different schools and regions to explore and learn from each other’s student projects. CELF worked collaboratively with the teachers by involving the teachers in planning the logistics of the symposium.

The change to a virtual meeting required a different strategy for preparing the student presentations. The CELF staff worked closely with the teachers on creative strategies for preparing presentations that take advantage of a virtual conferencing format. In addition, the CELF staff ensured that the teachers and students would be able to navigate the platform effortlessly. Having to convert to virtual presentations did not diminish the outcomes of the student symposium. The new format improved accessibility to participate in the symposium and enhanced creative expression by providing more options for taking part in and presenting at the symposium. Student creativity is not restricted to posters on a display board. The Gather platform provides a more accessible option for students to incorporate multimedia in their presentations.
CELF also capitalized on the combined virtual platform by inviting guest speakers who could educate, encourage, and congratulate the students. The combined symposium format gave students more opportunities to practice collaborative practice, clear communication, clear definition of tasks and responsibilities, and a clear understanding of the project’s goals, objectives, and strategies. Moving the symposium to a virtual format using the Gather virtual conference platform provided an opportunity to exceed the intended outcomes of the symposium planned in the grant application.

Observations of the virtual student symposium substantiated CELF’s success at achieving the intended outcomes of the symposium. Teachers make effective use of the virtual meeting places to prepare their students for the presentations. They also used virtual workspaces to interact with other teachers and the CELF staff on facilitating the symposium. Another indicator of the quality of effort planning the symposium was that the student presentations were in an appropriate format for the Gather platform and were delivered flawlessly. Attending several of the student presentations attested to the attainment of engaging students to acquire, interpret, and accurately communicate air quality data with the goal of using informed recommendations for resolving local environmental justice situations. Students also demonstrated their understanding of the science content while questioning other students doing presentations.

Interviews with teachers and students at the virtual symposium confirmed that civic science engagement was an effective pedagogy for improving STEM education. Teachers commented that the students were more motivated to work with scientific data that had real-world applications and can be used to help people. The teachers also expressed that it was valuable seeing student projects from the other regions. Student interviews supported what the teachers expressed about the value of learning through doing civic science. They appreciated having a relevant purpose for the data that they were collecting and analyzing. The students also felt that their presentations had more merit than other class presentations that had done. The civic science added importance to the presentations and gave the students a sense of purpose when preparing the presentations. The student and teacher testimonials provided by CELF supported the external evaluators observations and sentiments of the interviewees at the symposium.

**Teacher and Student Assessments**

This is the only deliverable of the project that could not be completely achieved when the workshop was being converted to a completely virtual format. The teacher survey developed by CELF was a valid instrument for measuring improvements in the scientific content, environmental justice content, air quality monitoring knowledge, civic engagement pedagogical knowledge, perceptions of student knowledge improvements. CELF was able to obtain a satisfactory return rate on the pre-survey and post-survey teaching assessments.

The CELF staff were able to make reliable conclusions about teacher gains based on the 21 teachers who completed both the pre-survey and post-survey. A Chi-square analysis of the teacher surveys indicated statistically significant gains (two-tailed P value less than 0.0001 in most of the intended outcomes except for the categories “civic engagement and social action,” “data collection analysis,” “education for sustainability,” and “interdisciplinary lesson plans.” An overall Mann-Whitney test analysis of the teacher survey show statistically significant gains (two-tailed P value less than 0.001). The improvements reported in the teacher surveys are consistent with verbal interviews performed on a sampling of teachers.
during student symposium. Based on the teacher interviews, the gains that were not statistically significant were skewed by the teachers’ motivations to enroll in the program. Teachers applied for this workshop because of their prior interest and experience with those particular measurables in the survey. These gains would have been statistically significant in a population of novice teachers wishing to learn how to use civic science pedagogy for STEM teaching.

For the student assessment, CELF planned on administering a student survey for measuring gains in student knowledge of environmental health in their communities, causes of air pollution, types of air pollution, pollution remedies and potential of skills developed into other local environmental health concerns. Unfortunately, it was not possible for the teachers to administer the student pre-surveys. Emerging COVID-19 pandemic guidelines implemented at the schools interfered with the ability for teachers to distribute the student pre-survey. CELF would have been able to successfully administer the student surveys if the project was able to be conducted as planned. Nevertheless, there are two ways to indicate student improvements in cognitive and affective learning outcomes. The first indicator of showing student gains is in the “perceptions of student knowledge improvements” component of the teacher survey. According to the teacher survey, students showed improvements in student knowledge of air quality and pollution prevention, environmental justice, civic responsibility and action, and interconnections between humans and the environment. Improvements in all the student gains knowledge areas were all statistically significant based on Chi Square analyses (two-tailed P value less than 0.0001). The second indicator of student gains was obtained through verbal interviews with students at the student symposiums. The fifteen students anonymously interviewed expressed that they gained in the knowledge categories. Questioning students during their presentations and the quality of the presentations also supported the student gains from participating in the CELF Citizen Science: Inquiry to Action program.

Table 1 - Achievement of Deliverables at a Glance

<table>
<thead>
<tr>
<th>Deliverables Proposed in Grant</th>
<th>Achievement of Deliverable</th>
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<tbody>
<tr>
<td>Deliverable Tasks</td>
<td>Achieved as Proposed</td>
</tr>
<tr>
<td>Task 1: School Outreach and Marketing</td>
<td>X</td>
</tr>
<tr>
<td>Task 2: Teacher Workshop Planning</td>
<td>X</td>
</tr>
<tr>
<td>Task 3: Conducting Teacher Workshops</td>
<td></td>
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<tr>
<td>Task 4: Staffing Logistics and Workshop Materials Development</td>
<td>X</td>
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<td>Task 5: Student Presurvey Administration</td>
<td>X</td>
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<tr>
<td>Task 6: School Site Visits and Co-Teaching On-site</td>
<td>X</td>
</tr>
<tr>
<td>Task 7: Student Symposium Planning</td>
<td>X</td>
</tr>
<tr>
<td>Task 8: Enactment of Student Symposium</td>
<td>X</td>
</tr>
<tr>
<td>Task 9: Completion of Project Evaluation</td>
<td>X</td>
</tr>
<tr>
<td>Task 10: Project Dissemination</td>
<td>X</td>
</tr>
</tbody>
</table>

**CELF Summer Institutes Turnkey Teacher Training**

COVID-19 pandemic restrictions prevented the CELF staff from carrying out a 3-day teacher training summer institute for schools in New York City. CELF made use of the opportunity to conduct a comparable program in the Houston area through a new partnership with Jesse Jones Park and Nature Center (JJPNS). CELF made good use of the JJPNS staff and facilities and led to sustainable partnership. The goals of the CELF Civic Science Inquiry to Action Program were reinforced during the training while teachers learned about conducting field studies on water quality monitoring that can be used in civic science teaching. Observations of the training activities and interviews with teachers attested to the value of the summer institute. The teachers were completely engaged in the field activities and shared ideas.
with other participants about how to employ the activities in their teaching. In the interviews teachers expressed that they gained new skills related to collecting environmental quality data.

Intellectual Merit and Broader Impacts Evaluation

The CELF Civic Science: Inquiry to Action project funded by the 2020-2021 National Geographic Explorer grant demonstrated intellectual merit in science education and showed the broader impact potential of benefiting society by contributing to the tools teachers can use to teach students how to use scientific data for desirable societal outcomes. Intellectual merit was achieved by advancing the knowledge of evidence-based teaching practices for integrating science content with civic engagement in K-12 schools. The intellectual merit of the CELF Civic Science: Inquiry to Action project was enhanced by the high sustainability value of the project. Part of the broader impact of the project is that the program offered teachers a pedagogical strategy that is affordable, simple to carry out, is supplemented with a support system provided by CELF staff and project partners, engages students in real environmental justice issues impacting their location, has well-defined diversity, equity, and in conclusion components, and provides relevancy to STEM curriculum. This program is generalizable to all schools and other class disciplines. The project is also appropriate as an outreach program for informal education providers such as environmental stewardship organizations, after-school programs, museums, nature centers, and zoos.

Outline of Successes and Recommendations

Overall, implementation of the project achieved all of its intended goals and outcomes with some modifications that did not detract from the intent expressed in the grant proposal. An overall post-grant evaluation score chart is provided in Table 2. Below is a list of exemplary successes and recommendations based on the external evaluator’s interpretation and assessment of the project.

Exemplary Successes:

- Teachers demonstrated gains in the instructional capacity for project-based learning through civic science pedagogy.
- Incorporated diversity, equity, and inclusion by deliberately soliciting and impacting teachers and students from underrepresented and economically disadvantaged populations.
- Demonstrates a generalizable strategy for incorporating place-based civic engagement into the STEM curriculum.
- Demonstrates a sustainable approach for incorporating place-based civic engagement into the STEM curriculum.
- Provides a foundation for a “train the trainer” model to disseminate the project.
- A model for carrying out the CELF Civic Science: Inquiry to Action project and related projects in a completely virtual format.
Recommendations:

- Seek out entities that could provide ongoing funding to continue and expand the CELF Civic Science: Inquiry to Action project.
- Make the CELF Civic Science: Inquiry to Action project available to all schools as an optional completely virtual workshop platform.
- Work with school districts to recruit teachers who would not normally be motivated to seek out civic science teacher training. This will provide more data on the feasibility of teaching civic engagement to all students.
- Expand CELF Civic Science: Inquiry to Action workshops to informal education and nature education professionals.
- Present a session about the CELF Civic Science: Inquiry to Action project at the American Association for the Advance of Science / United States Human Rights Network annual convention.
- Present a session at the National Science Teachers Association annual convention.
- Obtain grant funding to develop a related project on water quality testing.
- Establish an “Teacher Ambassador Program” to disseminate and promote projects at conferences and other in-service training venues.
- Establish a “train the trainer” program to facilitate dissemination of projects within designated regions.
- Encourage students to subject air quality projects to science fairs and science competitions.
- Encourage students/teachers to demonstrate civic science engagement pedagogy at the community school’s PTA/PTO or at a school open house for the community.
- With further funding, adapt to a global audience of teachers by translating materials into different languages.
Table 2: Overall Post-Grant Evaluation Score

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Exemplary - 4</th>
<th>Sufficient - 3</th>
<th>Adequate - 2</th>
<th>Insufficient - 1</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation</td>
<td>Project achieved implementation of new insight or idea, with potential benefits of change made clear.</td>
<td>Project achieved implementation of emerging innovation or trend, with potential benefits specified.</td>
<td>Project achieved practices commonplace within the field, or an adoption of a change with well-established benefits.</td>
<td>No innovation or specific potential improvement achieved.</td>
<td>4 – It is leading-edge to successfully engage young students in hands-on community science projects related to place-based environmental justice issues.</td>
</tr>
<tr>
<td>Justification</td>
<td>Strong rationale and significance of outcomes. Satisfied specific needs generalizable to other schools and communities.</td>
<td>Rationale or significance of project outcomes were too-specific or too-general.</td>
<td>Weak performance of outcomes meeting school or community need.</td>
<td>Unconvincing or no evidence of outcomes addressing school or community need.</td>
<td>4 – Project activities as stated in the grant proposal were relevant to the schools engaged in the project. The project is also generalizable to any school or informal ed setting.</td>
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## OVERALL POST-GRANT EVALUATION SCORE (Continued)

<table>
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<th>Criterion</th>
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<th>Insufficient - 1</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>Relations to organizational strategic vision</td>
<td>Project outcomes or activities aligned with both organizational vision and goals of the school and greater community.</td>
<td>Project elements aligned with goals of either the school or its greater community, but not both.</td>
<td>Project tangentially but not directly related to the school’s strategic vision or greater community goals.</td>
<td>No explicit relationship between project and the agenda of the school or greater community.</td>
<td>4- The project outcomes directly supported the school curriculum and engaged students in relevant active learning pedagogy promoted by the participating schools. The student projects also addressed real environmental justice issues in their communities.</td>
</tr>
<tr>
<td>Feasibility</td>
<td>Personnel, project activities timeline, and budget expenditures congruent with project description and outcomes.</td>
<td>Deficiencies or overestimations exist in personnel, timeline, or budget within tolerable range, outcomes appear achievable despite gaps or leaps.</td>
<td>Project’s assembled personnel, timeline, or budget expose weaknesses in plan design.</td>
<td>Insufficient information about personnel, project activities timeline, or budget expenditures to gauge outcomes.</td>
<td>4 – The project made effective use of CELF staff, project partners, and teachers. Timeline and budget changes due to the COVID pandemic did not reduce the scope and effectiveness of the outcomes.</td>
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<tr>
<td>Efficiency of approach</td>
<td>Completed project leveraged or contributed to existing infrastructure of CELF. Design appears scalable or replicable.</td>
<td>Completed project plan but overlooked or failed to make important connections to CELF’s infrastructure.</td>
<td>Completed project was isolated from CELF’s related work and or duplicated earlier effort with no revisions.</td>
<td>Project lacks sufficient detail to judge how it fits into the mission of CELF.</td>
<td>4 – In spite of set-backs due to the COVID pandemic, CELF staff used their experience with previous projects to complete the project without compromising replicability or scalability. Moving to a virtual platform expanded CELF’s ability to capitalize on future virtual programs.</td>
</tr>
<tr>
<td>Assessments</td>
<td>Demonstrated a clear picture of how data was collected and used to demonstrate degree to which outcomes are met.</td>
<td>Demonstrated good understanding of anticipated specific results or success, but plan lacked some details about data or methods.</td>
<td>Success was difficult to ascertain, flawed by untestable outcomes, inappropriate methods, or lack of useful data collection.</td>
<td>Evaluation plans missing or unusable.</td>
<td>4 – The CELF staff accurately anticipated the measurables for the project outcomes and collected valuable information for improving the project and assessing alternative modes of program delivery.</td>
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<tr>
<td>Sustainability</td>
<td>Evidence presented that project outcomes, or its impact, can be sustained locally beyond grant period, Efforts were shown to ensure sustainability.</td>
<td>Project outcomes could be sustained for a short period, but likely end without further support. Some efforts were made for sustainability.</td>
<td>Project outcomes were temporary, and likely to end at the end of the grant period. There were indirect efforts to secure commitment beyond the grant period.</td>
<td>No meaningful plans for future beyond funding term appeared in the outcomes</td>
<td>4- CELF ensured sustainability and dissemination by designing an inexpensive and organized student project that supported the curriculum of each school. In another sustainability effort, the CELF staff encouraged the teachers to build alliances with each other and with the grant partners.</td>
</tr>
</tbody>
</table>

| Total Score     | CELF created a sustainable project that can effectively be delivered in an on-site format, as originally planned, and in a virtual format as was modified to account for the COVID pandemic. One valuable outcome of the project was the community of teachers that formed during the project. The teachers were able to candidly share ideas and help each other troubleshoot issues that came up in the classroom. The teachers also felt comfortable making use of CELF staff and the grant partners. It is suggested that CELF establish a “train-the-trainer” cohort of teachers or informal educators who serves as ambassadors for integrating place-based community science or citizen science as a pedagogical component of a school’s curriculum. | 28/28 |